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Contraceptive Use Dynamics in Bangladesh

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Introduction

This study of contraceptive use dynamics was undertaken as part of the Secondary Analysis Project of the 1993-94 Bangladesh Demographic and Health Survey (BDHS). The purpose of the study was to conduct an analysis of contraceptive use histories collected in the survey to examine the efficacy and continuity of contraceptive use at the national level. The study was accomplished with technical assistance from Macro International Inc. and by employing the computing and analysis tools provided in the DHS Model Further Analysis Plan developed for such analyses (Curtis and Hammerslough, 1995).

Rationale of the study

Studies of contraceptive use dynamics usually encompass the following topics: contraceptive discontinuation, contraceptive switching behavior, and contraceptive failure. Such studies constitute an essential component of family planning research and evaluation for a variety of reasons. Although contraceptive prevalence rates are typically stressed in evaluating the family planning program, they do not provide a full measure of program success. The impact of contraceptive use on fertility also depends upon both reliability and continuity of use. Thus, the family planning program policymakers need to know the contraceptive failure and discontinuation rates for a complete assessment of program achievements. They also need this information to understand the efficacy of contraceptive use and to guide the program toward achieving its demographic targets (Curtis and Hammerslough, 1995; Hammerslough, 1991; Jejeebhoy, 1991).

Information from contraceptive use dynamics studies is also essential in counseling couples who wish to space and/or limit births—that is, to assist them to make an informed choice of contraceptive methods, to provide them with a range of contraceptive options to suit their needs, and to encourage them to maintain use. Furthermore, "contraceptive failure becomes a progressively more prominent fertility determinant as fertility preferences decline and as use of contraception increases." (Hammerslough, 1991) This implies that the study of contraceptive use dynamics becomes increasingly important for a population as it reaches relatively high levels of contraceptive use. In the 1993-94 BDHS, the contraceptive prevalence rate reached 45 percent of currently married women, and the mean ideal family size declined to 2.5 children among currently married women from the level of 4.1 in 1975 and 2.9 in 1989 (Mitra et al., 1994; Huq and Cleland, 1990). In this context, this study is of considerable value for the Bangladesh family planning program.

Background

Since liberation in 1971, Bangladesh has repeatedly reaffirmed its commitment to reduce fertility rates. This political commitment is crucial in understanding the achievement and success of the family planning program in Bangladesh. Every government in Bangladesh has identified population control as the top priority for government action. In 1976, accelerated growth of the population was declared the country's number one problem; a population policy was outlined, operational strategies were worked out, specific field programs were developed, and organizational and management arrangements were made for implementing the programs. Population planning was seen as an integral part of the total development process, and was incorporated into successive five-years plans (GB, 1994).

Family planning was introduced in the early 1950s through voluntary efforts of social and medical workers. It was adopted as a full-fledged government sector program in 1965. Since then, the national family planning program has evolved through a series of development phases. It was developed and implemented first as a large-scale field-based family planning program during 1965-75, then as a maternal and child health

(MCH) supported multi-sectoral family planning program during 1975-80, and most recently as a functionally integrated health and family planning program with emphasis on MCH, primary health care, and family planning as a package since 1980. The latest approach has been a shift towards launching a family planning social movement to raise and sustain awareness and interest in all segments of society about fertility reduction as a strategy for sustainable development (GB, 1994; Mitra et al., 1994).

The national family planning program has three major components—the Government of Bangladesh, non-governmental organizations (NGOs), and the subsidized commercial sector. The government family planning/MCH program has a huge contingent of about 30,000 female fieldworkers at the village level and a network of service outlets, providing family planning/MCH services at the client's doorstep. Besides the government program, more than 100 NGOs provide family planning services in Bangladesh. They offer a full range of contraceptives and operate widely in the country. Subsidized, commercial sector pills and condoms are sold nationwide, mostly through the Social Marketing Company's distribution system (Mitra et al., 1994; Mitra et al., 1992).

All these efforts have led to impressive achievements for the Bangladesh national family planning programs, even in the context of a socioeconomic environment which many experts thought was not conducive to promoting contraceptive use. General awareness about family planning is universal in the target groups of the population; virtually all married women of reproductive age know at least one modern family planning method. Contraceptive use rose steadily over the last two decades, achieving a dramatic increase from a mere 8 percent of married women in the 1975 Bangladesh Fertility Survey (BFS) to a high of 45 percent in the 1993-94 BDHS. Use of modern contraceptive methods grew even faster. Between the 1991 Contraceptive Prevalence Survey (CPS) and the 1993-94 BDHS, the prevalence for any method increased from 40 to 45 percent of married women, and that for modern methods from 31 to 36 percent (Mitra et al., 1994).

Associated with increasing contraceptive use, the country's fertility has started declining in a rapid and accelerating fashion. The total fertility rate declined from 6.3 births per woman in the mid-1970s to 3.4 births for the period 1991-93 (Mitra et al., 1994). The most dramatic decline occurred between 1989-91 and 1991-93 from 4.3 to 3.4 births or 21 percent in a short period of two years (Mitra et al., 1994).

However, to achieve replacement level fertility in the context of a large and growing population, further refinements of the family planning program will be necessary to enhance the quality and continuity of contraceptive use by responding more effectively to problems users experience with their methods (Mitra et al., 1994). This makes studies of contraceptive use dynamics even more of a prerequisite for the Bangladesh program.

Previous studies

There have not been many studies conducted on contraceptive use dynamics in Bangladesh. The few studies done were based on restricted samples, limited data, or inadequate methodologies. Thus, the Bangladesh family planning program has a dearth of firm, representative information on the quality and duration of contraceptive practice. A brief review follows of some of the studies considered to be relevant in understanding and interpreting the findings from the current study.

Data were collected on durations of contraceptive use in a monthly calendar in the 1985 CPS for the period between January 1983 and the survey interview date (Mitra, 1987). Because the survey did not collect birth histories, the calendar dealt exclusively with contraceptive use and the interviewer had no scope to cross-check a respondent's stated use and nonuse of family planning methods with her reproductive events, such

as births and pregnancies. Another important limitation was that the calendar had no provision to record reasons for terminating the use of a method. This precluded the use of the data to examine contraceptive discontinuation by reason and failure.

In the final report of the 1985 CPS survey, the data from the calendar were analyzed to examine continuation rates for almost all reversible methods. The continuation rates were derived as annual continuation rates by using the cross-sectional approach originally proposed by Laing (1985). The annual continuation rates were estimated to be 38 percent for condoms, 53 percent for pills, 72 percent for IUDs, 65 percent for periodic abstinence, and 63 percent for withdrawal. Estimates for other reversible methods were not computed because of the small number of observations. The given rates should be interpreted with caution; these are period rates and are not comparable to the probability of discontinuation during the first year of use.

Calendar data from the 1985 CPS were also investigated as part of the secondary analysis project of the survey (Islam et al., 1988). This investigation was based on the respondents' first period of use which started during the three-year interval covered by the contraceptive calendar. With life table techniques, the 12-month continuation rates were estimated at 63 percent for pills, 55 percent for condoms, 79 percent for IUDs, and 79 percent for periodic abstinence.

The 1988 Contraceptive Use Dynamics study (CUD) undertaken by the Bangladesh Fertility Research Program (BFRP) was carried out by reinterviewing a subset of respondents of the 1985 CPS, who at the time of interview were rural, currently married women with at least one living child, and not using male or female sterilization. Respondents who met these criteria were first listed, then classified as current users, past users and never-users. Reinterviewing was conducted with all ever-users but with only one-half of never-users. Consequently, the CUD sample was composed of rural women who were more experienced users and had a higher parity than a representative sample of all women. When the women were reinterviewed in March 1988, a complete contraceptive calendar which included pregnancies was collected for the previous 39 months. The life table probability of continuing a method for at least 12 months derived from the calendar was 80 percent for pills, 64 percent for condoms, 79 percent for IUDs, and 84 percent for periodic abstinence (Akhter and Ahmed, 1991).

The Pill Use Study carried out in 1990 investigated, among other things, the pill continuation and failure rates in Bangladesh (Larson et al., 1991). The study population was a cohort of women who started using the pill sometime during the six months prior to the 1989 CPS. Data were collected by reinterviewing respondents of the 1989 CPS, roughly 15 months after their initial interview. The reinterview questionnaire included a complete three-year contraceptive calendar to record by month, since January 1988, the following information: pregnancies, births, postpartum amenorrhea, contraceptive use or nonuse and the reasons for changing status, and the planning status of every pregnancy reported. The 12-month pill continuation rates obtained from the study were almost identical for rural and urban areas, 51 percent and 50 percent respectively.

Since 1977, the International Centre for Diarrhoeal Disease Research, Bangladesh has been administering a comprehensive Maternal, Child Health, and Family Planning (MCHFP) project in Matlab, a poor, conservative area of rural Bangladesh (Akbar et al., 1991). The project has been equipped with an excellent data source since its inception. The most salient feature of the data source is that the data come from a population-based prospective record system. Female fieldworkers employed in the project visit every home fortnightly to promote family planning and offer services including the supply of pills, condoms, and injectables. These workers keep a registry book recording their clients' contraceptive use, pregnancy status, and other information. Unlike data from retrospective surveys, Matlab data are free from recall errors and thereby provide a unique opportunity to study contraceptive use dynamics with reliable data.

An analysis of Matlab data was conducted by Akbar et al. (1991) to estimate the first contraceptive method and all method continuation rates. The intent was to investigate changes in continuation rates associated with various phases of the project. In the analysis, a generous definition of segment of use was employed allowing for periods of nonuse of up to four months as long as women resumed the same method (for first method use) or another method (for all method use). The estimates were obtained only for injectables, pills, and IUDs, as these were the major methods of contraception among the project population. The 12-month continuation rates of the three methods for women who adopted them as the first method between 1985 and 1987 were 50 percent for pills, 69 percent for injectables, and 78 percent for IUDs.

Another research report recently published investigated contraceptive failure based on the Matlab data collected during 1984-1989 (Bairagi and Rahman, 1996). The cumulative rates of failure at 12 months observed in the study were 1 percent for injectables, 3 percent for IUDs, 15 percent for pills, and 15 percent for "other" methods including the condom, foam, periodic abstinence, withdrawal, and herbal medicine. Although the quality of Matlab data is exceedingly high, the findings might not be representative for the whole of Bangladesh, particularly those pertaining to contraceptive use and fertility. As a result of the MCHFP project, contraceptive behavior and fertility in the intervention area in Matlab are different from the other parts of the country.

Data and methodology

Data source

The data analyzed in the study were taken from the responses of ever-married women interviewed in the 1993-94 BDHS. The details of the BDHS sample design are provided in the main report of the survey (Mitra et al., 1994). The BDHS sample was a nationally representative, stratified, two-stage sample. It was drawn from 301 sample sites selected with probability proportional to size from a national sampling frame based on the 1991 census. In choosing respondents for interview, a systematic sample of households was selected from the sample sites with an average "take" of 25 households in the urban sites and 37 households in rural sites. A total of 9,681 households were selected, of which 9,255 were found occupied at the time they were visited by the interviewing teams. Of the occupied households, 9,174 (99 percent) were successfully interviewed. In the successfully interviewed households, 9,900 ever-married women age 10-49 years were identified as respondents to be interviewed for the survey and interviews were completed for 9,640 or 97 percent of these.¹ The interviewing of respondents in the BDHS was carried out during November 1993-March 1994.

When the BDHS was conducted, there were five administrative divisions in the country: Barisal, Chittagong, Dhaka, Khulna, and Rajshahi. The BDHS sample was drawn with differential sampling fractions to provide separate estimates for each division as well as for urban and rural areas separately. Thus, appropriate weighting factors need be applied to develop nationally representative estimates from the BDHS sample.

Characteristics of the sample

The majority (55 percent) of ever-married women in the 1993-94 BDHS sample are in the 15-29 year age range, with 42 percent in their 20s (Mitra et al., 1994). More than nine out of 10 ever-married women are currently married. The compositions by age group and marital status are similar to those found in the 1991

¹ In addition to ever-married women, a subsample of their husbands was interviewed in the BDHS. Contraceptive histories were not collected in interviews with husbands.

CPS (Mitra et al., 1993). The majority—58 percent—of ever-married women have never attended school. Nevertheless, the data discerns some improvement compared to 61 percent of ever-married women in the 1991 CPS who had never attended school. The sample found 12 percent of ever-married women living in urban areas in 1993-94. This is lower than the proportion urban reported in the 1991 CPS (15 percent) and is most probably due to definitional changes between the two surveys. The distribution of ever-married women in the sample by division of residence is similar to that in the 1991 CPS, except that the proportion in Dhaka Division increased slightly from 29 to 31 percent and the proportion in Rajshahi Division decreased slightly from 26 to 24 percent. As in the 1991 CPS, almost nine out of 10 ever-married women in the sample are Muslim, with most of the remainder being Hindu.

As stated earlier, contraceptive prevalence rates in the 1993-94 BDHS sample are 45 percent for any method and 36 percent for modern methods (Mitra et al., 1994). Although, modern methods account for 80 percent of total current use in the sample, a substantial proportion (8.4 percent) of currently married women still remain dependent on traditional methods for family planning (Mitra et al., 1994). The substantial use of traditional methods has also been observed in the previous national family planning and fertility surveys (Mitra, 1987; Mitra et al., 1990; Huq and Cleland, 1990; Mitra et al., 1993). It is thus seen that efficacy of contraceptive use in Bangladesh is dependent, to a great extent, on how efficiently these methods are used by those who employ them.

Since 1989, the oral pill has become the dominant determinant of contraceptive use, trends, and thereby, impact in Bangladesh. It accounts for almost 40 percent of all contraceptive use in the BDHS, being used by 17 percent of currently married women in the sample (Mitra et al., 1994). Growth in pill use has been the prime factor in the dramatic rise of contraceptive use in the country. Between 1989 and 1993-94, the proportion of currently married women using oral pills almost doubled from 9 percent to 17 percent (Mitra et al., 1994). After oral pills, other commonly used methods in the BDHS sample are female sterilization (8 percent), periodic abstinence (5 percent), and injectables (5 percent). The use rates are only 3 percent or less for the remaining methods, namely, condoms, withdrawal, IUDs, and male sterilization. With oral pills, the use of all other methods, except sterilization, has also increased though slightly in the recent years. Both female sterilization and male sterilization recorded slight declines in their acceptance since 1991.

In sum, the vast majority (75 percent) of modern method users in the BDHS sample use reversible methods as opposed to permanent methods (Mitra et al., 1994). Since the fertility impact of reversible methods is dependent upon their consistent and proper use, continuation and use-effectiveness of these methods have become crucial indicators of the success of family planning performance in Bangladesh. Therefore, any improvement—in terms of either demographic effects or management and services strategies—of the Bangladesh family planning program is greatly dependent upon accurate information on contraceptive discontinuation and failure rates in the target populations.

Contraceptive use histories

Conventional sources of data for examining contraceptive use dynamics in the past have been clinical studies, acceptor follow-up surveys, and specialized studies. Although such data sources have provided valuable information on the quality and duration of contraceptive practice in developing countries, their findings have limitations in terms of both generalizability and methodology (Jejeebhoy, 1991).

Contraceptive use histories collected in the contraceptive calendar of the Demographic and Health Survey (DHS) questionnaire are viewed as an improved source of data to study contraceptive use dynamics. Data from this source have several advantages (Moreno, 1993; Moreno and Goldman, 1991). The histories are drawn from a national sample and are, therefore, free from the selection biases frequently associated with other types of samples. They can provide estimates for modern as well as traditional methods by the

demographic and socioeconomic characteristics of the respondents, and they are not affected by the loss to follow-up of users. More importantly, the way the data are collected using the calendar format facilitates the application of life table techniques to calculate contraceptive discontinuation, switching, and failure (Curtis and Hammerslough, 1995).

A six-year contraceptive calendar was employed in the 1993-94 BDHS questionnaire to collect the contraceptive use history of a respondent, covering the period from April 1988 up to the time of her interview (Mitra et al., 1994). The calendar allowed for information to be recorded by month on contraceptive use status, births, pregnancies, reasons for discontinuing a method, and marital status. The calendar was constructed with three columns and with a box in every column for every month in the six calendar years from April 1988 to March 1994. The structure of the calendar allowed for recording of information according to either the Bengali year or the English year.

The first column was assigned for identifying and marking the calendar months in which the respondent gave birth, the months in which she was pregnant, the months in which she used a contraceptive method, and the months of nonuse (that is, in which she did not use any contraceptive method). Every box (month) of this column contained only one code—a code for birth, pregnancy, use of a particular contraceptive method, or nonuse. Information was entered into the calendar at different stages of the interview. Immediately after completing the birth history, each reported birth since April 1988 was entered into the month of birth in the calendar and the duration of its pregnancy into the eight preceding months or into the preceding months up to April 1988 if the pregnancy occurred before that date. Thereafter, the interviewer asked for the duration of the pregnancy if the respondent was currently pregnant as well as for dates and durations of any other pregnancies back up to April 1988.

Data on the segments of use and nonuse of contraceptive methods were collected in the contraception section of the questionnaire. The current period of use was recorded in the calendar, then the interviewer probed for all previous periods of use in the calendar using the information already entered as reference points, such as names of children, dates of birth, and periods of pregnancy. The use of reference points aids the respondent's recall and helps reconcile the timing of contraceptive use with reproductive events. The calendar thus makes it possible to identify more precisely the months of use and nonuse of contraceptive methods.

The second column of the calendar was assigned for recording information on reasons for discontinuation of use of a method. This information was coded in the month corresponding to the last month of reported use of the method. The third column of the calendar was assigned for identifying the months in which the respondent was married and in which she was not. This information was collected through questions in the marriage section of the questionnaire.

Techniques of analysis

Life tables techniques have become a standard approach to study contraceptive use dynamics (Curtis and Hammerslough, 1995; Jejeebhoy, 1991). Three types of life tables are usually constructed to derive rates of interest, such as contraceptive continuation, discontinuation, and failure rates. The three types of life tables are single-decrement, multiple-decrement, and associated single-decrement (Curtis and Hammerslough, 1995). The purpose of employing each specific type of life table is discussed later.

Segments of use are employed as units of analysis in the construction of a life table for contraceptive discontinuation. A segment is an uninterrupted period of use of a particular contraceptive method. Computing cumulative rates of contraceptive continuation and discontinuation from a data set would be straightforward if one knew for each segment the length of use and the circumstances of discontinuation of

use (Potter, 1968). However, in a prospective study, there may be acceptors who are still using a contraceptive method or who were lost to follow-up at the time of last contact. Even in retrospective surveys like DHS, there are many respondents found to be using a contraceptive method at the time of the interview and others who have interrupted use for reasons considered irrelevant to the purpose of the analysis undertaken. Such truncated histories of use (censored segment of use) need to be exploited with more complete ones to derive an unbiased picture of contraceptive continuation as it changes with increasing time from adoption.

The life table techniques—by explicitly controlling for duration of use and censoring—allow for inclusion of both complete and incomplete segments of use in an analysis, and thus life table estimates are considered to be the most appropriate way of assessing the continuity of contraceptive use (Trussell and Kost, 1987). Segments of use are divided into monthly intervals measured from the time of beginning the segment. The construction of life tables for discontinuation rates, for example, starts with the calculation of month-by-month discontinuation rates. These rates are then linked together to obtain a cumulative discontinuation rate or continuation rate over a given period. Details of the procedures for the construction of life tables are provided in many documents on contraceptive use dynamics (e.g., Curtis and Hammerslough, 1995; Potter, 1968) and are not reiterated here.

Segments of use

This study is based on segments of use in a five-year period before the survey. Segments that began before this five-year period (left-truncated and left-censored segments) were excluded from the analysis. Inclusion of such segments complicates the analysis; moreover, their omission has little effects on discontinuation rates at short durations of less than two years (Curtis and Hammerslough, 1995). However, care would be necessary in interpreting continuation rates for long durations, as those estimates are likely to be affected by the exclusions.

The last three months of the calendar were ignored, that is, the three-month period before the interview was not included in counting segments of use. This was done to exclude first trimester pregnancies—which are seriously underreported—from the analysis, and hence to reduce bias in the estimated failure rates due to unidentified failures (Curtis and Hammerslough, 1995; Moreno, 1993). Therefore, the period covered by the data on segments of use is 3-62 months before the interview date for each woman.

The information on segments of use was extracted from the calendar data in the BDHS raw rectangular data files using the CAL2SPSS program provided in the DYNPAK package of computer programs provided with the DHS Further Analysis Plan (Curtis and Hammerslough, 1995). A total of 6,670 segments of use were included in the sample (Table 1). Oral pills yielded the highest number of segments of use (3,217) followed by traditional methods (1,302), injectables (794) and condoms (778). There were only 365 segments of IUD use and 215 of sterilization. In general, there were more segments of use of methods with high prevalence, except for sterilization. The major reason for this exception is that sterilization is a permanent method and has relatively more left-truncated and left-censored segments than other methods.

Censored segments account for 41 percent of all use segments included in the study. This underscores the importance of including censored segments in the analysis to have a complete picture of contraceptive use dynamics in the study population. The study findings would have certainly been biased had they been based only on completed segments.

Background variables

The national family planning and fertility surveys in Bangladesh have consistently reported variations in the contraceptive prevalence rates and method mix by background characteristics of respondents, establishing

the fact that some women are more likely to use contraception than others, while some are more likely to use a specific method (Mitra et al., 1994; Mitra et al., 1993; Huq and Cleland, 1990; Mitra et al., 1990; Mitra, 1987; Mitra and Kamal, 1985; MIS Unit, 1983). The efficacy and duration of contraceptive use also vary by background characteristics (Bairagi and Rahman, 1996; Islam et al., 1988; Mitra, 1987), but these differentials have been researched much less because of lack of appropriate data.

The BDHS data set provides opportunities to investigate differentials in contraceptive discontinuation behavior in greater detail. In the current study, differentials in contraceptive discontinuation, switching behavior, and failure are investigated by the following background characteristics of women: area of residence, region of residence, education, contraceptive intent, age, and parity. The background variables were extracted from the rectangular data file of the BDHS using the SELECT program provided in the DYNPAK package of computer programs (Curtis and Hammerslough, 1995), and were then matched to the segments of use using SPSS. The method-specific and total prevalence rates by these background characteristics, as estimated from the BDHS sample, are presented in Table 1.

Table 1 Percentage of currently married women age 10-49 by contraceptive method currently used, according to selected background characteristics, and the number of segments of use in the five years prior to the survey, Bangladesh, 1993-94

Background characteristic	Contraceptive method						Total
	Pill	IUD	Injectables	Condom	Traditional methods	Sterilization	
Area of residence							
Urban	20.9	3.7	4.4	8.3	9.8	7.2	54.4
Rural	16.9	2.0	4.5	2.3	8.2	9.4	43.3
Region							
Dhaka	18.2	1.9	4.4	3.0	8.0	8.9	44.3
Chittagong	9.1	2.0	4.4	2.1	5.9	5.8	29.3
Rajshahi	23.5	2.1	4.2	3.3	8.9	12.7	54.8
Khulna and Barisal	19.5	2.9	5.2	3.9	11.7	9.7	52.8
Education							
None	14.7	1.5	5.0	1.2	6.7	11.9	41.0
Primary	19.3	2.6	4.5	3.0	9.7	6.6	45.5
Secondary or more	23.8	3.9	2.7	9.7	12.1	3.9	56.1
Contraceptive intent							
Spacer	14.7	1.9	3.0	2.8	5.9	0.0	28.3
Limiter	19.5	2.4	5.6	3.1	10.1	15.3	55.9
Age							
10-24	16.5	2.0	3.3	3.2	5.7	1.5	32.2
25-49	17.9	2.3	5.2	2.9	10.0	13.7	51.8
Parity							
None	5.0	0.1	0.2	3.1	5.6	0.8	15.0
1	17.4	2.4	3.1	3.4	5.9	1.6	33.8
2	23.3	2.7	4.5	3.4	8.1	7.4	49.3
3 or more	18.1	2.4	5.8	2.7	9.7	13.4	52.0
Total	17.4	2.2	4.5	3.0	8.4	9.2	44.6
Number of current users	1,560	196	404	269	751	822	4,002
Number of censored segments	1,295	164	337	206	532	215	2,748
Total number of segments	3,217	365	794	778	1,302	215	6,670

Background variables collected in the survey usually refer to the time of the survey, so many of these variables may not be relevant to an earlier segment of use, particularly characteristics such as age and parity that change over time. The age and parity variables were created to refer to the start of the segment of use. Contraceptive intent was constructed from information collected on the planning status of births, that is, whether the birth was wanted at that time, wanted later, or not wanted at all. The information on the date that the segment of use began was used to identify the birth following a segment of use. If that birth was classified as wanted then or wanted later, the contraceptive intent for that segment was classified as "spacer." If the birth was reported as not wanted at all, the intention for that segment was classified as "limiter." As information on the planning status of births was collected only for children born in the last three years before the survey (i.e., since April 1990), only the segments that began after that date could be used for the analysis of discontinuation rates by contraceptive intent. For segments of use that were not followed by any births, the woman's current stated fertility intentions were used to define whether the segment was for spacing or limiting. Women who were sterilized or whose husband was sterilized were classified as being limiters at the time of the survey. Women who were not currently married at the time of the survey were classified as being unsure about their fertility intentions. Women with uncertain fertility intentions were included in the category of spacers.

For area of residence, region of residence, and education, segments of use were classified based on the values of the variables as recorded at the time of the survey. Although these values refer to the time of the survey and not necessarily to the time of use, relatively few segments of use were likely to have been misclassified. This is because few women are likely to have changed their status over a period of only five-years, with respect to area of residence, region of residence, and education.

Data Quality

In the experimental DHS surveys fielded in 1986 in Peru and the Dominican Republic, the contraceptive calendar was demonstrated to be superior to the traditional approach to gathering data on past use of contraceptives (Moreno et al., 1990). The calendar obtains more complete reports of use for periods prior to the survey and obtains information which is more internally consistent with other types of information.

However, the contraceptive calendar does not always yield good quality data. Information collected in the contraceptive calendar of the Philippines CPS was found wanting in terms of completeness of contraceptive use in the past (Choe and Zablan, 1991). Successful administration of the contraceptive calendar is not an easy task. It is difficult to train interviewers on the contraceptive calendar because it requires them to ask questions in an unstructured fashion. Field experience in Bangladesh showed that interviewers initially were intimidated by the apparent complex structure of the calendar. However, after a short period of time they started to prefer the calendar because it helped them to reconcile the timing of different events and to probe for information. In addition, the calendar places considerable demand on the respondent to recall detailed information for a relatively long period prior to the survey. The respondent may forget short durations of contraceptive use, and such omissions are believed to become more common further back in time and for certain methods, such as condoms (Curtis and Hammerslough, 1995). Thus, despite the calendar approach being superior to alternative retrospective data collection techniques, calendar data are not immune from data quality problems.

Quality of calendar data in the 1993-94 BDHS was examined in three ways. First, the patterns of contraceptive prevalence from the 1989 and the 1991 CPS were compared with those derived for the corresponding points in time from the calendar data. This was done to obtain an idea of the magnitude of underreporting of past use in the calendar data. Second, the distribution of segments of use by duration was

graphically examined to detect if reporting of past use was subject to heaping on certain durations. Finally, the reported status in the month following discontinuation of contraceptive use was compared with the reason for discontinuation in order to ascertain the extent of concealment of contraceptive failure. It is hypothesized that some women may report contraceptive failures as desired pregnancies. This would be seen in an unusually high proportion of women who discontinue use because they wanted another child becoming pregnant in the month following discontinuation (Curtis and Hammerslough, 1995).

Underreporting of past use

Table 2 shows contraceptive prevalence by method at the time of both the 1989 and the 1991 CPS, as estimated from the calendar data of the 1993-94 BDHS. For comparison purposes, the table also contains the published contraceptive prevalence by method from the current status data of the 1989 and the 1991 CPS (Mitra et al., 1993; Mitra et al., 1990).

Table 2 Percentage of married women using each method of contraception at the time of the 1989 and 1991 Contraceptive Prevalence Surveys (CPS) in Bangladesh, based on calendar data from the 1993-94 DHS and current status data from the 1989 and 1991 CPSs, Bangladesh

Method	1993-94 Calendar data for 1991 (Ages 10-47)	1991 CPS ¹ (Ages 10-49)	1993-94 Calendar data for 1989 (Ages 10-44)	1989 CPS ² (Ages 10-49)
No method	62.8	60.1	71.1	68.6
Pill	15.0	13.9	10.2	9.1
IUD	2.0	1.8	1.6	1.7
Injectables	2.2	2.6	0.9	1.1
Condom	2.1	2.5	1.7	1.9
Female sterilization	8.2	9.1	7.7	9.0
Male sterilization	1.2	1.2	1.2	1.5
Periodic abstinence	4.2	4.7	3.7	3.8
Withdrawal	1.5	2.0	1.4	1.2
Others	0.8	2.0	0.6	2.0

¹ Source: Mitra et al. (1993)

² Source: Mitra et al. (1990)

The 1991 CPS was conducted between June and October 1991, and the 1989 CPS was conducted between March and August 1989—roughly 2.5 and 4.5 years respectively before the 1993-94 BDHS (Mitra et al., 1993; Mitra et al., 1990). When computing the contraceptive prevalence distribution from the contraceptive calendar for the time of the 1991 CPS, the BDHS sample was restricted to exclude women under age 12 at the time of the BDHS because these women would have been under age 10 at the time of the 1991 CPS. For the same reason, the contraceptive prevalence distribution for the time of the 1989 CPS was computed from the calendar data by restricting the BDHS sample to exclude women under age 14 at the time of the BDHS. Thus, the contraceptive prevalence distribution estimated from the 1993-94 BDHS calendar data for the time of the 1991 CPS corresponds approximately to women age 10-47 in 1991, while the contraceptive prevalence distribution for the time of the 1989 CPS estimated from the 1993-94 BDHS corresponds to women age 10-44 in 1989.

The contraceptive prevalence distribution was given only for women age 10-49 in the reports of the 1991 and 1989 CPSs. As a result, the contraceptive prevalence distribution from the calendar data for the time of either CPS survey had to be contrasted with the contraceptive prevalence distribution from the CPS for women age 10-49 instead of for women in the age range corresponding exactly to the sample available from the calendar data. However, the difference between the contraceptive prevalence distribution for women age 10-44 and for women age 10-47 in the 1991 CPS is very small because women age 47-49 account for less

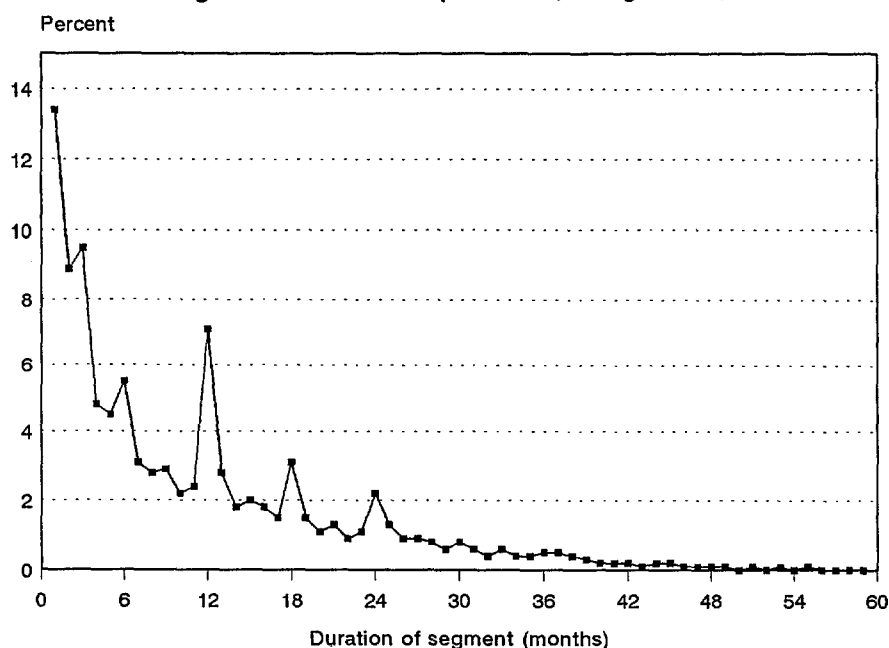
than 7 percent of the sample in that survey (Mitra et al., 1993). For the 1989 CPS, the differences between the prevalence structure for women age 10-49 versus women age 10-44 are also small because women age 45-49 also account for a small percentage of the sample in the 1989 CPS (Mitra et al., 1990).

Estimates of the contraceptive prevalence distribution for the time of the 1991 CPS, as obtained from the calendar data, are extremely close to the corresponding estimates from the 1991 CPS. The proportion of married women using a modern method (i.e., pill, IUD, injectables, condom, and sterilization) at the time of the 1991 CPS is 30.7 percent in the calendar data, compared to the estimate of 31.1 percent found in the 1991 CPS. Data also corresponds for individual methods, both modern and traditional, thereby indicating that there was no significant underreporting of past use for any method in the calendar data at least for the last two and a half years covered by the calendar. There is also no evidence of any significant underreporting of past use of contraceptives for the earlier years of the calendar, from the comparison of the contraceptive prevalence rates of the 1989 CPS with those derived from the calendar data. "Current status data are believed to be more reliable than retrospectively collected data because they are not subject to recall problems." (Curtis and Hammerslough, 1995) Thus, it may be concluded from the comparisons in Table 2 that the calendar data in the 1993-94 BDHS are of good quality.

Heaping of use

Figure 1 shows the distribution of reported durations of completed segments of contraceptive use for the period covered by the study. Similar to other studies (Moreno et al., 1990), calendar data in the 1993-94 BDHS are subject to heaping of segments of use at specific durations. Heaping is notable at the durations of 6, 12, 18, 24, and 30 months, but is most pronounced at the 12-month duration. Since the major portion of the analysis is based on 12-month discontinuation and failure rates, heaping might have an impact on the findings. It is not within the scope of the current study to investigate the impact of heaping on the discontinuation and failure rates, but such investigations should be undertaken in the future to achieve a complete assessment of the quality of calendar data.

Figure 1 Percent distribution of reported duration of completed segments of contraceptive use, Bangladesh, 1993-94



Concealment of contraceptive failure

Table 3 contains a cross-classification of completed segments of use, by reported reason for discontinuation and pregnancy/contraceptive status in the following month. Of the 488 women who were pregnant in the month following the end of a segment of use, 36 percent reported discontinuation of contraceptive use for reasons other than contraceptive failure. It may be that these women did not want to report that they had experienced a failure while using a method. If this is true, the calendar data would lead to underestimation of contraceptive failure rates. Among women who say they discontinued use in order to become pregnant, 16 percent were recorded as pregnant in the month immediately following discontinuation; these women account for 24 percent of all women becoming pregnant in the month following the end of a segment of use. This is quite high and suggests that some women may report contraceptive failures as desired pregnancies. In contrast, only 5 percent of women who discontinued use for other reasons and who did not immediately switch to another method were pregnant in the month after discontinuation. This figure is low and does not indicate that contraceptive failures are reported as discontinuations for other reasons (Curtis and Hammerslough, 1995).

Table 3 Distribution of discontinued segments of use by reason for discontinuation and status in the month immediately following discontinuation, Bangladesh, 1993-94

Reason for discontinuation	Status in the month after discontinuation				Total	Percent of the exposed ¹ pregnant
	Pregnant	Termination	Not using a method	Using another method		
Contraceptive failure	311	1	0	0	312	100.0
To get pregnant	117	0	638	1	755	15.5
Other reason	61	0	1,262	1,532	2,855	4.6
Total	488	1	1,900	1,533	3,922	20.5

¹ The exposed are defined as those users who are not using another method of contraception in the month following discontinuation of their original method, i.e., the denominator for the percentage includes those women who are pregnant, who experienced a termination, or who are not using any method of contraception.

Discontinuation Rates

Shown in Table 4 are the 12-month and 24-month discontinuation rates for each reversible method in Bangladesh. The median duration of use for each method is also provided in the table, representing the duration by which 50 percent of users stop using the methods. Discontinuation rates are generally high for any reversible method in Bangladesh. According to the estimates computed for all reversible methods combined, almost half of women who initiate the use of a method discontinue it within a year and nearly two-thirds discontinue within two years with the median duration of use for all reversible methods being only slightly over one year.

Discontinuation rates are associated with large variations by method type. The IUD has the lowest discontinuation rates, while the condom has the highest followed by injectables, traditional methods, and the pill. Over 70 percent of users stop using condoms within a year, compared to 38 percent of IUD users. Similar variation is notable in both the 24-month discontinuation rates and the median duration of use.

Differentials in discontinuation rates by selected background characteristics are examined in Tables 5 to 7 for the pill, condoms, and traditional methods. The other reversible methods are not included in this or subsequent tabulations by background characteristics because of the small number of segments of use of these methods in the sample, which precludes computation of stable life table estimates for the different subgroups of interest.

Table 4 Life table discontinuation rates and median durations of use by method, Bangladesh, 1993-94

Method	12-month discontinuation rate (percent)	24-month discontinuation rate (percent)	Median duration of use (months)	Number of segments of use
Pill	44.6	61.2	15.9	3,217
IUD	37.5	54.0	19.0	365
Injectables	57.2	70.3	11.2	794
Condom	72.1	82.8	4.5	778
Traditional methods	47.6	65.9	13.4	1,302
Total ¹	47.7	62.7	13.3	6,670
Total ²	49.4	65.2	12.3	6,456

¹ All methods² All reversible methods, i.e., excluding sterilization

Table 5 Life table discontinuation rates and median duration of use for the pill by background characteristics, Bangladesh, 1993-94

Characteristic	12-month discontinuation rate (percent)	24-month discontinuation rate (percent)	Median duration of use (months)	Number of segments of use
Area of residence				
Urban	51.4	66.3	11.6	494
Rural	43.4	60.3	16.7	2,723
Region				
Dhaka	48.8	62.9	12.6	1,125
Chittagong	49.8	70.7	12.1	545
Rajshahi	34.8	50.0	24.0	835
Khulna and Barisal	45.8	64.5	14.6	711
Education				
None	39.4	55.1	19.8	1,386
Primary	46.3	62.8	15.0	1,019
Secondary or more	51.6	69.4	11.6	812
Contraceptive intent¹				
Spacer	56.0	76.4	9.9	1,047
Limiter	38.4	54.1	21.8	1,116
Age				
Under 25	45.3	62.6	15.1	2,553
25-49	42.1	55.8	18.5	664
Parity				
0	83.9	98.2	3.9	247
1	48.7	68.0	12.5	696
2	42.0	57.9	17.0	713
3 or more	38.1	54.1	21.5	1,560
Total	44.6	61.2	15.9	3,217

¹ Based on segments of use that begin after April 1990 only

There are no marked variations in the discontinuation rates among the administrative divisions of the country, except that both the 12-month and 24-month discontinuation rates are found to be considerably lower for the pill in Rajshahi division and the 12-month discontinuation rate for the condom is lower in

Table 6 Life table discontinuation rates and median duration of use for the condom, by background characteristics, Bangladesh, 1993-94

Characteristic	12-month discontinuation rate (percent)	24-month discontinuation rate (percent)	Median duration of use (months)	Number of segments of use
Area of residence				
Urban	67.4	79.5	4.9	227
Rural	74.1	84.1	4.4	551
Region				
Dhaka	74.6	82.9	4.1	286
Chittagong	63.6	82.6	6.7	100
Rajshahi	72.6	83.8	3.8	208
Khulna and Barisal	72.2	81.2	5.0	184
Education				
None	73.4	79.2	4.7	178
Primary	69.0	81.2	5.3	198
Secondary or more	73.1	85.1	3.8	403
Contraceptive intent¹				
Spacer	76.5	88.2	3.6	297
Limiter	65.6	73.9	6.1	237
Age				
Under 25	74.0	84.5	4.2	606
25-49	65.5	76.9	5.9	173
Parity				
0	82.3	94.3	3.2	161
1	74.0	86.1	3.5	153
2	72.0	87.4	5.1	162
3 or more	65.9	73.0	5.5	302
Total	72.1	82.8	4.5	778

¹ Based on segments of use that begin after April 1990 only

Chittagong division. Urban-rural differentials in discontinuation rates vary by method. Traditional methods and the pill have higher discontinuation rates in urban than rural areas of Bangladesh; however, for the condom, the discontinuation rates appear lower in urban than rural areas.

For all three methods, spacers have higher discontinuation rates than limiters, which suggests that the motivation for contraceptive use is an important determinant of contraceptive discontinuation. Spacing births is likely to be more common among younger users as well as among users with lower parity. Thus, the discontinuation rates also appear higher among users under age 25 than those age 25 or older, and higher among users with lower parity than among those with higher parity.

Discontinuation rates of the methods considered vary with education: both the 12-month and 24-month discontinuation rates generally increase as education increases. This finding seems to contradict the increase in prevalence with education (Table 1) and may be related to the fact that users with more education are relatively younger and are therefore more likely to be spacers than limiters.

One other finding from Tables 4-7 that is worth noting is that discontinuation is most rapid in the first 12 months of use of a method. Therefore, the analysis in the remainder of this paper will focus on 12-month discontinuation rates.

Table 7 Life table discontinuation rates and median duration of use for traditional methods by background characteristics, Bangladesh, 1993-94

Characteristic	12-month discontinuation rate (percent)	24-month discontinuation rate (percent)	Median duration of use (months)	Number of segments of use
Area of residence				
Urban	51.7	66.0	11.7	172
Rural	47.0	65.9	13.9	1,130
Region				
Dhaka	49.4	67.3	12.3	365
Chittagong	46.5	65.1	13.9	250
Rajshahi	47.0	66.6	14.3	335
Khulna and Barisal	47.2	64.6	13.5	352
Education				
None	42.7	62.0	16.8	537
Primary	43.9	64.1	15.4	412
Secondary or more	59.2	73.7	9.2	353
Comparative intent¹				
Spacer	57.1	80.8	10.2	409
Limiter	39.3	53.0	21.4	466
Age				
Under 25	54.4	74.4	11.1	910
25-49	31.5	44.9	34.5	392
Parity				
0	61.1	84.5	8.7	200
1	57.0	72.9	10.1	224
2	49.7	72.4	12.4	232
3 or more	39.2	55.1	20.1	646
Total	47.6	65.9	13.4	1,302

¹ Based on segments of use that begin after April 1990 only

Contraceptive Discontinuation Rates by Reason for Discontinuation

Reasons for discontinuation are examined in this section. The reasons are classified into five mutually exclusive and exhaustive categories: method failure, to get pregnant, side effects, method-related reasons (spouse disapproves, health concerns, availability, want a more effective method, inconvenient to use, and cost) and other reasons (infrequent sex, separated/widowed, fatalistic, don't know, infecund, menopause, and other). Method-specific discontinuation rates for each reason were obtained from a multiple-decrement life table constructed with five modes of decrement corresponding to the five reasons for discontinuation. In the multiple-decrement life table, the reason-specific rates are calculated by dividing the number of discontinuations for a particular reason at each duration by the exposure at that duration obtained from the single-decrement life table. Hence, the five reason specific discontinuation rates add up to the total discontinuation rate at each duration.

The discontinuation rates calculated from a multiple-decrement life table are called net discontinuation rates because they represent the discontinuation rates due to a particular reason in the presence of other reasons for discontinuing. A user may discontinue a method for any number of reasons, and the user is more likely to discontinue for a given reason when other reasons of discontinuation are absent or less prevalent. Hence, the net discontinuation rates for each reason are dependent on the discontinuation rates for the other reasons (see Curtis and Hammerslough, 1995).

Table 8 contains the 12-month discontinuation rates by reason for each method in Bangladesh. These rates show that side effects are the major cause of discontinuation for the pill, IUD, and injectables. However, users of the condom and traditional methods are less likely to discontinue their method due to side effects. Only 9 percent of condom users and 2 percent of traditional method users discontinue using their method due to side effects, compared to 37 percent of injectables users, 29 percent of IUD users, and 23 percent of pill users. Other method-related reasons are the main cause of discontinuation for the condom and traditional methods.

Table 8 Life table 12-month discontinuation rates by reason for discontinuation and contraceptive method, Bangladesh, 1993-94

Method	Reason for discontinuation					Total
	Contraceptive failure	To get pregnant	Side effects	Method-related reasons ¹	Other reasons	
Pill	1.7	7.3	22.5	7.3	5.8	44.6
IUD	0.3	1.9	29.0	3.6	2.7	37.5
Injectables	1.1	5.1	36.9	10.3	3.9	57.2
Condom	6.0	14.1	8.8	34.1	9.1	72.1
Traditional methods	9.7	11.2	2.0	18.0	6.8	47.6
Total ²	3.6	8.0	18.0	12.3	5.8	47.7
Total ³	3.7	8.3	18.7	12.7	6.0	49.4

¹ Reasons include: husband disapproves, health concerns, availability, want a more effective method, inconvenient to use, and cost.

² All methods

³ All reversible methods, i.e., excluding sterilization

Although the discontinuation rates due to method failure are generally low, women are more likely to become accidentally pregnant while depending on the condom or traditional methods than when depending on the pill, IUD, or injectables. Discontinuation of use in order to get pregnant is also more common among users of the condom and traditional methods compared to users of other methods.

The reason specific discontinuation rates by selected background characteristics are shown in Tables 9 to 11 for the pill, IUD, and traditional methods. Side effects are the major cause of discontinuation for the pill in almost every subgroup. There are no remarkable variations in the pill discontinuation rate due to side effects by any of the selected background characteristics. There are also no remarkable variations in the discontinuation rate for method failure or other method-related reasons. However, women using the pill are more likely to stop using it in order to get pregnant if they are spacers than limiters, if they have at least some education compared to no education, if their age is under 25 than if their age is 25 or above, and if they are at lower compared to higher parity. The variations by parity are particularly noteworthy for women who have yet to give birth to a child. Among these women, nearly 40 percent of pill users stop using their method within a year to get pregnant, compared to only 11 percent or less among women who have given birth to at least one child. The other non-method-related reasons are a more common cause of discontinuation for the pill among women with secondary or higher education than those with primary or no education; they are also a more common cause for pill discontinuation among urban than rural women, and among women who have no children than among those who have children.

Table 9 Life table 12-month discontinuation rates for the pill by reason for discontinuation and background characteristics, Bangladesh, 1993-94

Characteristic	Reason for discontinuation					Total
	Contraceptive failure	To get pregnant	Side effects	Method-related reasons	Other reasons	
Area of residence						
Urban	2.9	6.3	25.2	6.0	11.0	51.4
Rural	1.5	7.5	22.0	7.5	4.9	43.4
Region						
Dhaka	2.4	7.6	22.9	7.2	8.7	48.8
Chittagong	3.1	7.2	26.1	9.1	4.3	49.8
Rajshahi	0.9	6.3	18.2	7.4	2.0	34.8
Khulna and Barisal	0.6	8.2	24.1	6.0	6.9	45.8
Education						
None	1.7	5.5	23.3	6.1	2.9	39.4
Primary	1.5	9.0	23.7	8.0	4.1	46.3
Secondary or more	2.2	8.4	19.5	8.5	13.0	51.6
Contraceptive intent¹						
Spacer	2.0	14.3	25.4	8.3	6.0	56.0
Limiter	1.5	0.1	22.9	6.3	7.6	38.4
Age						
Under 25	1.8	8.8	22.3	7.4	5.0	45.3
25-49	1.7	1.6	23.3	6.7	8.8	42.1
Parity						
0	2.0	38.6	23.1	8.8	11.3	83.9
1	2.4	11.2	22.9	8.5	3.8	48.7
2	1.3	5.0	20.6	7.5	7.7	42.0
3 or more	1.6	1.9	23.1	6.4	5.0	38.1
Total	1.7	7.3	22.5	7.3	5.8	44.6

¹ Based on segments of use that begin after April 1990 only

Method-related reasons are the major reason for first-year discontinuation of the condom in all subgroups. Among the administrative divisions, discontinuation of condom use due to method-related reasons is highest in Rajshahi division followed in descending order by Khulna and Barisal division, Dhaka division, and Chittagong division. There are also marked variations in the condom discontinuation rates for method-related reasons according to education: women with at least some education have a higher discontinuation rate for these reasons than women with no education.

Desire to get pregnant is a more common cause of condom discontinuation in rural than urban areas, among spacers than limiters, among younger than older women, and among women having no children than among those with at least one child. The probability of becoming accidentally pregnant while using the condom is greater among uneducated than educated women, and among younger than older women.

The differentials in the reason specific discontinuation rates for traditional methods have patterns more or less similar to those for the condom.

Table 10 Life table 12-month discontinuation rates for the condom by reason for discontinuation and background characteristics, Bangladesh, 1993-94

Characteristic	Reason for discontinuation					Total
	Contraceptive failure	To get pregnant	Side effects	Method-related reasons	Other reasons	
Area of residence						
Urban	6.3	7.3	10.9	30.7	12.2	67.4
Rural	5.9	16.9	7.9	35.5	7.8	74.1
Region						
Dhaka	5.3	12.9	10.6	30.7	15.0	74.6
Chittagong	7.5	15.3	6.0	27.9	6.9	63.6
Rajshahi	4.2	14.9	7.0	40.7	5.8	72.6
Khulna and Barisal	8.3	14.3	9.3	35.1	5.1	72.2
Education						
None	10.0	18.9	10.4	28.3	5.8	73.4
Primary	3.9	14.2	9.7	35.2	5.9	69.0
Secondary or more	5.4	12.0	7.6	36.0	12.1	73.1
Contraceptive intent¹						
Spacer	6.1	20.9	5.2	33.8	10.5	76.5
Limiter	4.9	0.5	12.1	36.5	11.6	65.6
Age						
Under 25	7.0	16.9	7.4	35.3	7.5	74.0
25-49	2.7	4.5	13.3	29.9	15.1	65.5
Parity						
0	7.1	32.1	6.8	32.0	4.2	82.3
1	8.0	13.1	7.7	32.7	12.5	74.0
2	1.8	11.5	12.9	31.2	14.5	72.0
3 or more	6.7	6.5	8.0	37.5	7.2	65.9
Total	6.0	14.1	8.8	34.1	9.1	72.1

¹ Based on segments of use that begin after April 1990 only

Contraceptive Switching Behavior

Contraceptive switching behavior is analyzed by examining the user's new contraceptive use status in the month immediately following discontinuation in conjunction with information on the reason for discontinuation. The new contraceptive status is classified into four categories, and the multiple-decrement life table is again employed to obtain the rates of switching to a defined status within 12 months of initiating use.

The rate of switching to no method of contraception is of particular interest because it represents the state of highest risk of pregnancy. However, many users who abandon the use of contraception do so because they no longer have a need for contraception. These users need to be distinguished from users who still have a need for contraception but abandon use, consequently exposing themselves to the risk of an unwanted pregnancy. Hence, the new contraceptive status of a woman in the month after discontinuation is classified into one of four categories: no longer needs contraception, using another modern method of contraception (switch to modern method), using another traditional method of contraception (switch to traditional method), and not using contraception. The definition of no longer in need of contraception is based on the given

Table 11 Life table 12-month discontinuation rates for traditional methods by reason for discontinuation and background characteristics Bangladesh, 1993-94

Characteristic	Reason for discontinuation					Total
	Contraceptive failure	To get pregnant	Side effects	Method-related reasons	Other reasons	
Area of residence						
Urban	14.6	8.5	2.8	17.3	8.5	51.7
Rural	9.0	11.6	1.9	18.1	6.5	47.0
Region						
Dhaka	11.1	9.8	2.0	18.1	8.4	49.4
Chittagong	10.4	15.7	2.3	13.5	4.6	46.5
Rajshahi	8.6	11.8	3.1	16.7	6.9	47.0
Khulna and Barisal	8.8	9.0	0.7	22.1	6.6	47.2
Education						
None	11.7	9.5	1.1	16.2	4.1	42.7
Primary	8.2	11.5	2.4	14.4	7.4	43.9
Secondary or more	8.5	13.3	2.7	24.6	10.1	59.2
Contraceptive intent¹						
Spacer	11.3	20.7	1.1	17.1	6.9	57.1
Limiter	7.4	1.2	2.2	19.3	9.3	39.3
Age						
Under 25	11.1	15.1	2.2	19.6	6.4	54.3
25-49	6.3	1.8	1.5	14.2	7.8	31.5
Parity						
0	7.7	28.0	0.5	18.8	6.0	61.0
1	10.1	16.8	2.5	19.0	8.6	57.0
2	7.3	11.1	2.0	22.2	7.0	49.7
3 or more	11.0	3.9	2.3	15.8	6.3	39.2
Total	9.7	11.2	2.0	18.0	6.8	47.6

¹ Based on segments of use that begin after April 1990 only

reason for discontinuing use. Users reporting that they discontinued for one of the following reasons are classified as not having a need for contraception: failure, want to get pregnant, infrequent sex, separation/widowhood, and infecund/menopause. Note that users who discontinued due to method failure are classified as no longer in need of contraception. Although this group is something of a special case, it is not considered separately here because discontinuation due to failure has already been examined in the previous section. Users who discontinue for reasons other than those listed above are considered to still be in need of contraception. Those who are using another method in the month after discontinuation are classified as having switched to another method (modern or traditional), and those who are not using any method or who are pregnant are classified as having abandoned use (see Curtis and Hammerslough, 1995).

Table 12 presents the 12-month discontinuation rates by status after discontinuation for each method in Bangladesh. Among users who still need contraception but discontinue use within a year, a large number (42 percent) abandon use of contraception in the month after discontinuation. This suggests that family planning services are not meeting the needs of many women who discontinue. In addition, abandonment of use by so many users has serious implications for fertility levels, because these women expose themselves to the risk of unwanted pregnancy, at least temporarily, by not starting another method immediately

Table 12 Life table 12-month discontinuation rates by status after discontinuation and contraceptive method, Bangladesh, 1993-94

Contraceptive method	Status after discontinuation				Total
	No need for contraception ¹	Switch to modern method	Switch to traditional method	Abandon use	
Pill	12.2	11.7	4.0	16.7	44.6
IUD	2.7	18.5	2.2	14.0	37.5
Injectables	7.3	23.3	3.2	23.5	57.2
Condom	23.5	26.7	9.8	12.1	72.1
Traditional methods	24.9	13.5	3.4	5.8	47.6
Total ²	14.4	15.0	4.2	14.0	47.7
Total ³	15.0	15.5	4.4	14.5	49.4

¹ Discontinuation for the following reasons: failure, want to get pregnant, infrequent sex, separation/widowhood, infecund/menopause.

² All methods

³ All reversible methods, i.e., excluding sterilization

following discontinuation of their original method. Abandonment of use is highest among users of injectables, and lowest among users of traditional methods, while it is intermediate among the users of the pill, IUD, and condom.

The high rate of moving to the "no need" category for users of traditional methods and the condom is largely due to the fact that many of the women using these methods either become accidentally pregnant or discontinue because they want to get pregnant. A substantial number of pill users also move to the "no need" category, mainly because they want to get pregnant.

Users of a modern method who switch to another method usually adopt another modern method. Further, 14 percent of traditional method users switch to a modern method within a year of initiating their original method. However, these findings do not necessarily indicate that family planning users will have reduced dependence on traditional methods in the future. Although the proportion (4.4 percent) of users switching to a traditional method appears low compared to the proportion switching to a modern method, in absolute numbers, more users switch from modern to traditional methods than from traditional to modern methods because there are more users of modern methods.

Differentials in the switching rates by the selected background characteristics are shown in Tables 13 to 15 for the pill, the condom, and traditional methods. Switching behavior of pill users varies between rural and urban areas. Rural pill users are more likely to abandon use after discontinuation than urban users. Moreover, while urban users are more likely to switch to another method after discontinuation than to abandon use altogether, the reverse is true for rural users. This may indicate that urban pill users have better access to alternative methods than rural users, but firm conclusions on this cannot be drawn from this analysis.

Among the administrative divisions, abandonment of pill use is most common in Chittagong and least common in Rajshahi. Abandonment of use also varies among pill users by their level of education and contraceptive intent. Users who are using the pill to space births are more likely to abandon use altogether than those who are using the pill to prevent future births which suggests that motivation may play a significant role in post-discontinuation behavior. The variations by education show that pill users are less likely to abandon use if they have secondary or higher education than if they have less education.

Table 13 Life table 12-month discontinuation rates for the pill by status after discontinuation and background characteristics, Bangladesh, 1993-94

Characteristic	Status after discontinuation				Total
	No need for contraception	Switch to modern method	Switch to traditional method	Abandon use	
Area of residence					
Urban	14.7	17.0	5.7	14.0	51.4
Rural	11.8	10.7	3.7	17.2	43.4
Region					
Dhaka	14.0	13.3	4.6	17.0	48.8
Chittagong	13.5	8.7	4.2	23.4	49.8
Rajshahi	8.2	12.0	3.0	11.5	34.8
Khulna and Barisal	13.2	11.0	4.2	17.3	45.8
Education					
None	8.7	8.8	3.2	18.7	39.4
Primary	12.4	11.4	4.2	18.3	46.3
Secondary or more	17.9	17.0	5.3	11.4	51.6
Contraceptive intent¹					
Spacer	19.7	11.3	4.5	20.5	56.0
Limiter	5.8	14.3	4.7	13.6	38.4
Age					
Under 25	13.9	10.9	3.7	16.8	45.3
25-49	5.9	14.6	5.4	16.2	42.1
Parity					
0	47.9	11.8	4.2	20.0	83.9
1	16.5	9.6	4.3	18.4	48.7
2	9.8	13.3	3.0	15.9	42.0
3 or more	6.0	11.8	4.4	15.9	38.1
Total	12.2	11.7	4.0	16.7	44.6

¹ Based on segments of use that begin after April 1990 only

Among pill users, spacers are more likely to have no need for contraception after discontinuation than limiters, because they are more likely to discontinue in order to get pregnant. Pill users are also more likely to have no need for contraception after discontinuation if their age is under 25 than if their age is 25 or above, if they are at lower than higher parity, and if they are more educated than less educated. Among the administrative divisions, pill users are the least likely to have no need for contraception in Rajshahi division.

There are no marked variations in the rates of abandoning use after discontinuation among condom users. In every subgroup classified by the selected background characteristics, condom users are more likely to switch to another method than to abandon use altogether. The rate of switching to another modern method is particularly high among urban users, users in Dhaka and Rajshahi, users with secondary or higher education, and among limiters, older women, and women at higher parity. Like pill users, condom users are more likely to have no need for contraception after discontinuation among spacers than limiters, among younger than older women, and among women at lower than at higher parity. However, unlike pill users, condom users are less likely to have no need for contraception in urban than in rural areas, and among educated women compared to uneducated women.

Table 14 Life table 12-month discontinuation rates for the condom by status after discontinuation and background characteristics, Bangladesh, 1993-94

Characteristic	Status after discontinuation				Total
	No need for contraception	Switch to modern method	Switch to traditional method	Abandon use	
Area of residence					
Urban	15.5	35.1	5.3	11.4	67.4
Rural	26.8	23.2	11.6	12.5	74.1
Region					
Dhaka	22.5	33.2	5.7	13.2	74.6
Chittagong	28.6	14.5	8.5	12.1	63.6
Rajshahi	21.8	30.4	11.0	9.4	72.6
Khulna and Barisal	24.3	18.8	15.3	13.8	72.2
Education					
None	31.4	17.0	10.8	14.1	73.4
Primary	21.3	22.7	10.3	14.6	69.0
Secondary or more	21.3	32.7	9.0	10.1	73.1
Contraceptive intent¹					
Spacer	31.2	24.0	10.8	10.5	76.5
Limiter	10.3	33.9	10.0	11.3	65.6
Age					
Under 25	27.7	24.9	10.2	11.2	74.0
25-49	9.3	33.0	8.1	15.1	65.5
Parity					
0	41.6	14.5	14.4	11.8	82.3
1	26.7	24.7	9.0	13.6	74.0
2	18.1	32.4	7.0	14.5	72.0
3 or more	15.4	31.3	9.1	10.1	65.9
Total	23.5	26.7	9.8	12.1	72.1

¹ Based on segments of use that begin after April 1990 only

Traditional method users who discontinue use within a year are consistently more likely to switch to another method, particularly a modern method, than to abandon use. The rate of switching to a modern method is particularly high among users with secondary or higher education and largely explains their higher 12-month discontinuation rate compared to less educated users. The variation observed in the rate of switching to the status of having no need for contraception largely reflects the differentials in discontinuation due to desire for pregnancy and contraceptive failure discussed in the previous section.

Contraceptive Failure Rates

Contraceptive failure rates often are of particular interest in the study of contraceptive use dynamics and fertility because they result directly in unwanted pregnancies and, unless the pregnancy is aborted, contribute to fertility levels. Indeed, as contraceptive use becomes widespread in a population and desired family size falls, contraceptive failures account for an increasing proportion of all pregnancies. Contraceptive failure rates vary considerably by method. They also vary across subgroups of the population because some women

Table 15 Life table 12-month discontinuation rates for traditional methods by status after discontinuation and background characteristics, Bangladesh, 1993-94

Characteristic	Status after discontinuation				Total
	No need for contraception	Switch to another method	Switch to traditional method	Abandon use	
Area of residence					
Urban	27.1	17.0	2.2	5.4	51.7
Rural	24.6	13.0	3.6	5.8	47.0
Region					
Dhaka	26.5	13.2	3.1	6.6	49.4
Chittagong	29.6	9.1	1.3	6.5	46.5
Rajshahi	22.3	16.0	5.2	3.5	47.0
Khulna and Barisal	22.5	14.6	3.5	6.5	47.2
Education					
None	23.7	10.8	2.1	6.0	42.7
Primary	23.8	11.3	3.9	4.9	43.9
Secondary or more	27.9	20.2	4.8	6.3	59.2
Contraceptive intent¹					
Spacer	35.9	10.5	4.5	6.3	57.1
Limiter	14.6	16.2	1.9	6.7	39.3
Age					
Under 25	29.9	14.5	4.0	6.0	54.3
25-49	12.9	11.2	2.2	5.2	31.5
Parity					
0	38.5	11.7	4.7	6.1	61.0
1	32.8	13.4	3.6	7.2	57.0
2	21.7	17.1	4.8	6.1	49.7
3 or more	18.9	12.9	2.4	5.0	39.2
Total	24.9	13.5	3.4	5.8	47.6

¹ Based on segments of use that begin after April 1990 only

use contraception more effectively than others. High failure rates may indicate weaknesses in the family planning program in providing information about correct use of methods, and examination of differentials in contraceptive failure rates helps identify groups of users who experience difficulties using particular contraceptive methods effectively. The observed failure rate in a population is calculated from a multiple-decrement life table. The net failure rate obtained from the multiple-decrement life table depends not only on the level of failure but also on the level of discontinuation for other reasons. If discontinuation for reasons other than failure are very high, failure rates will correspondingly be reduced because few women are exposed to the risk of failure for very long. Hence, differentials in net failure rates between methods and populations reflect not only differentials in the level of failure, but also differentials in the level of discontinuation for other reasons. If the levels of discontinuation for other reasons vary greatly between the different populations of interest, the comparison of failure rates will be distorted.

The way to overcome the problem of distorted failure rates is to calculate failure rates using an associated single-decrement life table. Such a life table assumes that contraceptive failure is the only risk operating, i.e., women will only discontinue use of method if they fail while using it. Hence, the effect of other

competing reasons for discontinuation is eliminated. The associated single-decrement life table can be constructed by treating all discontinuations for reasons other than failure as censored observations. The failure rates calculated in this way are called gross failure rates. They represent the failure rates that would be expected if failure was the only reason for discontinuing use. As such, they are theoretical failure rates, and represent the underlying risk of failure in the population (see Curtis and Hammerslough, 1995).

Table 16 presents the gross 12-month failure rates for each method, for all methods, and for all reversible methods. The 12-month failure rate for all methods combined is 4.8 percent. The rate rises only slightly when sterilization is excluded. The failure rates vary considerably by methods. IUD is the most effective method in Bangladesh. The next most effective methods are injectables and the pill. The 12-month failure rates for condoms and traditional methods are much higher compared to those of the IUD, pill, and injectables.

Table 16 also shows the approximate 95-percent confidence intervals for the failure rate of each method, which enables the statistical significance of differentials to be assessed. If the confidence intervals of two rates overlap, the difference is not statistically significant. The condom and traditional methods have significantly higher failure rates than the pill, IUD, and injectables, and the IUD failure rate is significantly lower than the pill failure rate.

Table 16 Life table 12-month gross failure rates and 95-percent confidence intervals by method, Bangladesh, 1993-94

Contraceptive method	Failure rate (percent)	95-percent confidence interval	
		Lower bound	Upper bound
Pill	2.3	1.7	2.9
IUD	0.4	0.0	1.2
Injectables	1.6	0.4	2.8
Condom	11.2	7.7	14.7
Traditional methods	12.6	10.2	14.9
Total ¹	4.8	4.3	5.4
Total ²	5.1	4.3	5.9

¹ All methods.

² All reversible methods, i.e., excluding sterilization

Table 17 presents the gross failure rates and 95-percent confidence intervals for the pill, the condom, and traditional methods by background characteristics. There is very little variation in the pill failure rate by background characteristics, although the pill failure rates in Dhaka and Chittagong are significantly higher than in Rajshahi and Khulna and Barisal. There is more variation in the failure rates of the condom and traditional methods, but due to wide confidence intervals associated with the failure rates, only the age differentials are significant with younger women experiencing higher failure rates than older women. This probably reflects higher fecundity among younger women.

Table 17 Life table 12-month gross failure rates and 95-percent confidence intervals by method and selected background characteristics, Bangladesh, 1993-94

Characteristic	Pill			Condom			Traditional methods		
	Rate	95-percent confidence interval		Rate	95-percent confidence interval		Rate	95-percent confidence interval	
		Lower bound	Upper bound		Lower bound	Upper bound		Lower bound	Upper bound
Area of residence									
Urban	4.2	1.9	6.6	10.5	4.4	16.6	18.7	11.5	26.0
Rural	2.0	1.4	2.6	11.5	7.2	15.9	11.6	9.3	14.0
Region									
Dhaka	3.2	1.9	4.6	9.5	4.2	14.8	15.0	10.3	19.7
Chittagong	4.5	2.4	6.7	12.1	2.5	21.7	13.0	7.7	18.3
Rajshahi	1.1	0.3	1.9	8.0	2.1	13.9	11.3	7.0	15.6
Khulna and Barisal	0.8	0.0	1.6	15.9	7.3	24.6	11.1	7.2	15.0
Education									
None	2.2	1.2	3.2	18.9	9.3	28.5	14.5	10.7	18.2
Primary	1.9	0.9	2.8	7.2	1.5	12.9	10.2	6.6	13.7
Secondary or more	3.2	1.6	4.8	10.0	5.3	14.7	12.4	7.7	17.1
Contraceptive intent¹									
Spacer	3.0	1.6	4.4	13.0	5.8	20.3	16.1	11.0	21.2
Limiter	2.0	1.0	3.0	9.1	2.6	15.5	9.3	5.7	12.8
Age									
Under 25	2.3	1.5	3.1	13.6	9.1	18.1	15.2	12.2	18.1
25-49	2.2	0.8	3.6	4.3	0.0	8.7	7.3	4.2	10.5
Parity									
None	2.9	0.1	5.6	12.8	5.2	20.5	11.1	5.2	17.0
1	3.3	1.7	4.8	14.4	5.2	23.6	14.6	8.6	20.7
2	1.5	0.5	2.5	3.4	0.0	7.9	9.2	4.7	13.7
3 or more	2.1	1.1	3.1	12.2	6.5	17.9	13.4	10.2	16.5
Total	2.3	1.7	2.9	11.2	7.7	14.7	12.6	10.2	14.9

¹ Based on segments of use that begin after April 1990 only

Summary and Conclusion

This analysis of the 1993-94 BDHS calendar data has provided valuable insights into contraceptive discontinuation and switching behavior in Bangladesh. Although contraceptive prevalence has increased considerably in recent years, contraceptive discontinuation rates are high—more than 40 percent of users of all reversible methods, except the IUD, discontinue use within a year. These discontinuation rates are somewhat higher than those found in other studies on Bangladesh, but this may reflect differences in the samples or methodology used or in the definition of contraceptive discontinuation. The main reason for discontinuation of the pill, IUD, and injectables is side effects, while other method-related reasons dominate for the condom and traditional methods. The 12-month failure rate is relatively low for the pill, IUD, and injectables, but is significantly higher for the condom and traditional methods.

A particularly important finding is that a substantial proportion of women who discontinue use within a year and who still need to use a method do not immediately switch to another method. This is particularly true

among pill users. These women are exposed to the risk of pregnancy, at least temporarily, and attention should be focused on understanding and meeting their contraceptive needs.

Demographic factors such as contraceptive intent (spacing versus limiting), age, and parity generally appear to affect discontinuation more than socioeconomic factors such as area of residence, region, and education. However, much of the higher discontinuation among young, low parity women who want additional children is explained by their higher discontinuation in order to become pregnant. Contrary to expectation, educated women are more likely than less educated women to discontinue use. However, women with secondary or higher education are more likely than less educated women to switch methods after discontinuation if they still need contraception, which suggests that educated women are more willing or more able to experiment with different contraceptive methods if their original method does not suit them. Urban users are also more likely to switch methods than their rural counterparts.

Given the recent increases in contraceptive prevalence in Bangladesh, contraceptive discontinuation and switching are likely to become increasingly significant determinants of contraceptive prevalence and fertility. If the Bangladesh family planning program is to continue to build on its recent success, the concerns of women over the side effects of modern methods must be addressed. Follow-up visits to address problems experienced with methods are extremely important, and alternative methods need to be available for those women who find a particular method unsuitable for them. Such services will enable the family planning program to better meet the needs of individual women.

References

- Akbar, Jalaluddin, James F. Phillips, and Michael Koenig. 1991. Trends in contraceptive method mix, continuation rates and failure rates in Matlab, Bangladesh: 1978-87. In *Measuring the dynamics of contraceptive use*, compiled by United Nations. New York: United Nations. 123-136.
- Akhter, Halida Hanum and Saifuddin Ahmed. 1991. *Determinants of contraceptive use dynamics in rural Bangladesh*. Dhaka: Bangladesh Institute of Research for Promotion of Essential and Reproductive Health Technologies (BIRPERHT).
- Bairagi, Radheshyam and Mizanur Rahman. 1996. Contraceptive failure in Matlab, Bangladesh. *International Family Planning Perspectives* 22(1):21-25.
- Choe, Minja Kim and Zelda C. Zablan. 1991. Contraceptive use discontinuation and failure rates in the Philippines: Estimates from the 1986 Contraceptive Prevalence Survey. In *Measuring the dynamics of contraceptive use*, compiled by United Nations. New York: United Nations. 83-96.
- Curtis, Siân L. And Charles R. Hammerslough. 1995. *Model further analysis plan: Contraceptive use dynamics*. Calverton, Maryland: Macro International Inc.
- Government of Bangladesh (GB). 1994. *Country report: Bangladesh*. International Conference on Population and Development, September, Cairo, Egypt. Dhaka: Government of Bangladesh.
- Hammerslough, Charles. 1991. Overview. In *Measuring the dynamics of contraceptive use*, compiled by United Nations. New York: United Nations. 1-12.
- Huq, Md. Najmul and John Cleland. 1990. *Bangladesh Fertility Survey 1989: Main Report*. Dhaka: National Institute of Population Research and Training (NIPORT).
- Islam, M.A., Elizabeth Frankenberg, and Shafiqul Islam. 1988. Duration of contraceptive use in Bangladesh. In *Bangladesh Contraceptive Prevalence Survey - 1985: Secondary analysis*, ed. A. Kantner, Elizabeth Frankenberg, M.A. Islam, and S.N. Mitra. Dhaka: Mitra and Associates. 116-147.
- Jejeebhoy, Shireen. 1991. Measuring contraceptive use-failure and continuation: An overview of new approaches. In *Measuring the dynamics of contraceptive use*, compiled by United Nations. New York: United Nations. 21-51.
- Laing, John E. 1985. Continuation and effectiveness of contraceptive practice: A cross-sectional approach. *Studies in Family Planning* 16(3):138-153.
- Larson, A., S. Islam, and S.N. Mitra. 1991. *Pill use in Bangladesh: Compliance, continuation and unintentional pregnancies*. Report of the 1990 Pill Use Study. Dhaka: Mitra and Associates.
- Management Information System (MIS) Unit. 1983. *Bangladesh Contraceptive Prevalence Survey - 1981*. Dhaka: Ministry of Health and Population Control (MHPC).
- Mitra, S.N. and G.M. Kamal. 1985. *Bangladesh Contraceptive Prevalence Survey - 1983: Final report*. Dhaka: Mitra and Associates.

- Mitra, S.N. 1987. *Bangladesh Contraceptive Prevalence Survey - 1985: Final report*. Dhaka: Mitra and Associates.
- Mitra, S.N., Ann Larson, Gillian Foo, and Shahidul Islam. 1990. *Bangladesh Contraceptive Prevalence Survey - 1989: Final report*. Dhaka: Mitra and Associates.
- Mitra, S.N., C. Lerman, and S. Islam. 1992. *Bangladesh Contraceptive Prevalence Survey - 1991: Key findings*. Dhaka: Mitra and Associates.
- Mitra, S.N., Charles Lerman, and Shahidul Islam. 1993. *Bangladesh Contraceptive Prevalence Survey - 1991: Final report*. Dhaka: Mitra and Associates.
- Mitra, S.N., M. Nawab Ali, Shahidul Islam, Anne R. Cross, and Tulshi Saha. 1994. *Bangladesh Demographic and Health Survey 1993-94*. Calverton, Maryland: National Institute of Population Research and Training (NIPORT), Mitra and Associates, and Macro International Inc.
- Moreno, Lorenzo, Noreen Goldman, and Ozer Babakol. 1990. Collection of survey data on contraception: Experimental field studies in Peru and the Dominican Republic. Paper presented at the annual meeting of the Population Association of America, May, Toronto, Canada.
- Moreno, Lorenzo and Noreen Goldman. 1991. Contraceptive failure rates in developing countries: Evidence from the Demographic and Health Surveys. *International Family Planning Perspectives* 17(2):44-49.
- Moreno, Lorenzo. 1993. Differences by residence and education in contraceptive failure rates in developing countries. *International Family Planning Perspectives* 19(2):54-60.
- Potter, Robert G. 1968. The multiple decrement life table as an approach to the measurement of use effectiveness and demographic effectiveness of contraception. In *Handbook for service statistics in family planning programs*, by John A. Ross, Frederick F. Stephan, and Walter B. Watson. New York: Population Council.
- Trussell, James and Kathryn Kost. 1987. Contraceptive failure in the United States: A critical review of the literature. *Studies in Family Planning* 18(5):237-283.

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